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MUD SPRINGS

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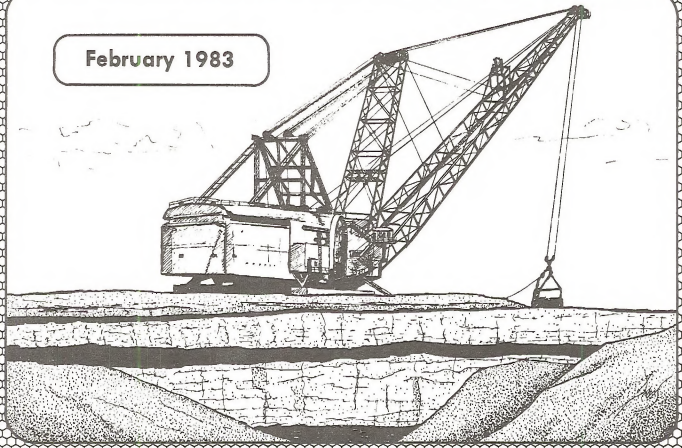

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POWDER RIVER RESOURCE AREA TRACT PROFILE
MUD SPRINGS

PART I: SITE-SPECIFIC ANALYSIS AND PRELIMINARY FACILITY EVALUATION REPORT OF THE MUD SPRINGS COAL LEASE TRACT

By Bureau of Land Management

PART II: TRACT SUMMARY REPORT, MUD SPRINGS

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CONTENTS

PART I

DESCRIPTION OF THE PROPOSED ACTION 1
CHAPTER I — AFFECTED ENVIRONMENT 3
- Geology and Topography 3
- Soils 3
- Water Resources 3
- Vegetation 4
- Agriculture 5
- Ownership and Land Use 5
- Wildlife 7
- Cultural Resources 7
- Recreation 7
- Visual Resources Management 8
- Climate and Air Quality 8
- Noise 8
- Transportation Facilities 8
- Socioeconomics 8

CHAPTER II — ENVIRONMENTAL CONSEQUENCES 11
- Geology and Topography 11
- Soils 11
- Water Resources 11
- Vegetation 14
- Agriculture 14
- Ownership and Land Use 14
- Wildlife 15
- Cultural Resources 15
- Recreation 15
- Visual Resources Management 15
- Climate and Air Quality 15
- Noise 16
- Transportation Facilities 16
- Socioeconomics 16
- Net Energy Analysis 16

CHAPTER 3 — PRELIMINARY FACILITY EVALUATION REPORT 21
- Introduction 21
- Assumptions and Variables 21
- Environmental Consequences 21
- Water Resources 22
- Ownership and Land Use 22
- Recreation 22
- Visual Resources Management 22
- Wildlife 22
- Cultural Resources 23
- Air Quality 23
- Socioeconomics 23

REFERENCES 25
APPENDICES 27

PART II

Tract Description 30
Entities Expressing Interest 40
Coal Resource Class Designation 40
Coal Geology 43
Potential Use of Coal 44
Transportation 44
Mineability 44
Marketability 45
Attachments 47

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

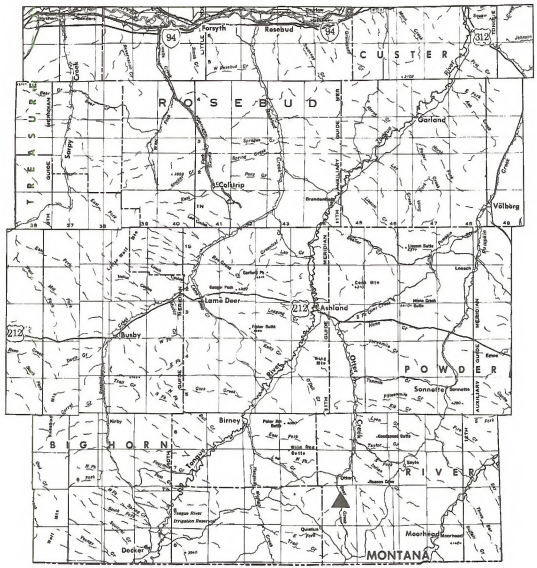
PART I

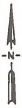
Site-Specific Analysis and Preliminary Facility Evaluation Report

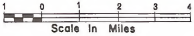
Mud Springs Coal Lease Tract
Powder River County, Montana

Miles City District Office
Miles City, Montana

February 1983

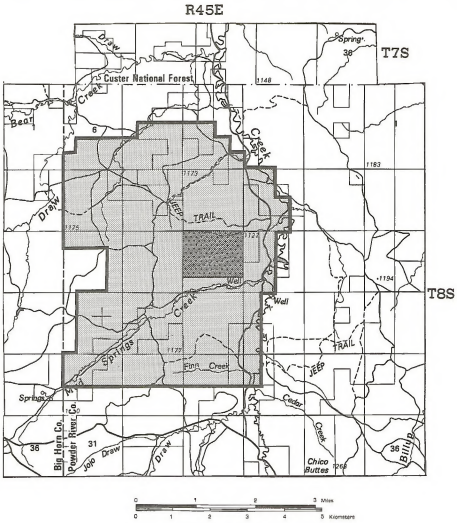






▲ Tract

MUD SPRINGS LOCATION MAP



MUD SPRINGS

- Meets BLM Further Consideration for Coal Leasing Requirements
- State Owned Coal
- Existing State Surface and Subsurface Mineral Leases
- Tract Boundary

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is to offer for competitive lease an 8,200-acre tract of land in southwestern Powder River County, Montana. The tract, which contains an estimated 300.0 million tons of recoverable coal, comprises an area identified by BLM Resources Evaluation as an economical mining unit for the development of a 40-year strip mining operation. It is located approximately 36 miles south of Ashland and nine miles north of the Montana-Wyoming border. The maps preceding this page show the general location of the tract. Attachment A to Part II gives a legal description of the tract. A preliminary facility evaluation report is included as Chapter III.

In preparing to offer this tract, personnel from the BLM, Miles City District, inventoried the tract to determine the site specific resource values and then analyzed the potential environmental effects from coal development on this individual tract. Total surface disturbance was assumed to present a "worst case" scenario. Previous planning included application of surface owner consultation, multiple use and unsuitability criteria, (43 CFR 3461). Any new findings of unsuitability are reflected in the delineation and development proposal of the tract described in this profile.

The tract contains, in place, 632.9 million tons of federal coal and 36.5 million tons of state coal. The 480 acres of state coal are leased and will not be considered as part of the affected environment by this profile. Annual production from the mining unit is assumed to be 7.5 million tons. Approximately 337 persons would be employed during construction and 225 during production.

Surface disturbance would be about 208 acres each year. A total of 8,200 acres, that area underlain by the coal seams, would be disturbed by mining. Additional surface would be disturbed by shop facilities and associated mining and reclamation activities. Railroad access, if needed, would disturb approximately 339 acres. More specific information on the proposed mining operation is available in Part II, "Tract Summary Report," prepared by Resources Evaluation.

It is assumed that proper mining and reclamation would be carried out according to existing state and federal regulations. These include: Office of Surface Mining Reclamation and Enforcement (30 CFR 700-899); Environmental Protection Agency (40 CFR 0-399); Department of the Interior coal management program regulations (30 CFR 211, 43 CFR 23, and 43 CFR 3400); and the regulations of the Montana Department of State Lands.

CHAPTER I
AFFECTED ENVIRONMENT

GEOLOGY AND TOPOGRAPHY

Geology

The tract is located on the northeast flank of the Powder River Basin. Regional dip is southwesterly at less than one degree. One northeast-southwest trending fault cuts the tract with displacements up to 160 feet.

All surface rocks exposed are within the Paleocene Tongue River Member of the Fort Union Formation. The three minable beds are all subbituminous C in rank. The mineable beds in descending order are the Anderson, Dietz, and Canyon.

The Anderson seam averages 33 feet in thickness. Estimated per acre tonnage is 58,400. Total estimated federal uncommitted tonnage is 169 million. The ash, sulfur and BTU contents respectively, are 4.13%, 0.31% and 8,500 per pound. An estimated 1,900 acres of Anderson scoria is present.

The Dietz seam averages 13 feet in thickness. Estimated per acre tonnage is 23,000. Estimated federal uncommitted tonnage is 132 million. The ash, sulfur and BTU contents, respectively, are 3.95%, 0.39% and 8,200 per pound. The Anderson-Dietz interburden ranges from 50 to 80 feet. Very little if any scoria is present.

The Canyon seam averages 25 feet in thickness. Estimated tonnage per acre is 44,200. Estimated federal uncommitted tonnage is 308 million tons. Estimated ash, sulfur, and BTU contents, respectively, are 4.65%, 0.34% and 8,000 per pound. Dietz-Canyon interburden ranges from 95 to 180 feet.

Tract gas and oil potential is low. One dry gas and oil well has been drilled within the tract. Six gas and oil wells have been drilled within a five-mile radius of the tract boundary. All were dry holes.

Topography

The high point of the Mud Springs tract is 4,030 feet in elevation along the south boundary. The low point is along Bear Creek at about 3,590 feet above sea level. The major drainage in the tract is the ephemeral Mud Springs Creek. The northern third of the tract drains into Davidson Draw, Little Bear Creek and Bear Creek. Intermittent Bear Creek cuts across the eastern edge of the tract.

General tract topography consists of several valley floors with about a 200 foot rise to the flat topped upland drainage divides. The hills between valley floors and uplands are gently rolling to rolling.

SOILS

Soils are composed of deep clayey (Kobar) and loamy (Yamac, McRae, Cooers) soils on nearly level to gently sloping (0-40%) fans, footslopes and terraces. Moderately deep calcareous soils (Birney, Delpoint, Thurlow) over softly consolidated siltstones and sandstones on moderately sloping to strongly sloping (4-15%) sideslopes. Shallow calcareous soils (Cabbart, Ringling, Yawdim) on moderately steep to very steep sideslopes.

Many mapping units throughout the coal area occur as complex, variable patterns of deep, moderately deep and shallow soils, some of which include rock outcrop.

The soils data is from the Powder River County published survey.

WATER RESOURCES

Groundwater

This tract is underlain by several aquifers. Shallow aquifers are alluvium, Anderson clinker, and the Tongue River Member of the Fort Union Formation. The 300 foot-thick Lebo Shale Member of the Fort Union separates the Tongue River Member from deeper aquifers, which include the Tullock Member (Ft. Union Formation), Hell Creek and Fox Hills aquifers, various sandstones and shales, and the Madison Group.

Alluvium under Bear Creek averages about 43 feet thick. Water table levels in the alluvium range from 5 to 17 feet below land surface near the stream channels to 18 to 39 feet below land surface on nearby slopes and tributary washes.

The Tongue River Member contains lenticular siltstone and sandstone that is not areally extensive. These rock units grade abruptly into Anderson clinker in some places. Anderson, Dietz, and Canyon coal beds are apparently the most continuous shallow aquifers. Part of the water in the Anderson discharges east, through the clinker, into alluvium along Bear Creek.

Comparison of water levels in separate aquifers shows that the potentiometric head is lower in successively deeper coal aquifer units. This suggests that the site is a recharge area for aquifers in the Tongue River Member. A test well isolating the Anderson coal bed had a water depth of 18 feet. A Dietz well had a depth of 38 feet and a Canyon coal bed well has a water depth of 106 feet. In some places Anderson coal is hydraulically connected to alluvium through clinker.

A Canyon coal well in the area discharged at a rate of three gallons per minute (gpm). An alluvial well discharged at a rate of five gpm.

Transmissivity and hydraulic conductivity values for Canyon coal are, respectively, about 40 square feet per day (ft^2/day) and two feet per day (ft/d). Values for alluvium are, respectively, about 1,300 ft^2/day and 42 ft/d. Average velocity of water passing through alluvium is about two ft/d. Velocity of water through Canyon coal is about 0.7 ft/d. Specific capacities are less than 0.5 gpm per foot of drawdown.

Ground water quality is quite variable. Total dissolved solids (TDS) concentrations of alluvial water ranges from 2,720 to 5,040 milligrams per liter (mg/l) and consists mostly of magnesium, sodium, and sulfate. TDS concentration of water from the Tongue River Member ranges from 1,110 to 4,760 mg/l and is mostly a sodium sulfate or sodium bicarbonate type of water. Well water quality usually exceeds recommended maximum concentrations for drinking water.

Five stock or domestic wells exist within the tract. Twenty-one wells are located outside but within two miles of the tract. They are listed as stock, domestic, or unused wells. Six springs also exist within two miles of the tract boundary.

Surface Water

This area is drained by ephemeral streams that empty into Bear Creek. Bear Creek is an intermittent stream that follows, and in some places comes within the eastern tract boundary. Most streamflow occurs from March to May. Discharge of Bear Creek, measured during May 1975 and March 1976, was 0.28 and 0.01 cubic foot per second (cfs), respectively. During January and March of 1975, measured flow ranged from 7.1 to 53 cfs and probably reflects short periods of snowmelt over frozen ground. The mean annual flood for Bear Creek is about 14 cfs. Bear Creek's 25-year flood discharge is about 400 cfs.

Fourteen reservoirs are indicated in the tract by topographic maps. Only one of these is perennial. Most are dry by midsummer.

Water quality of Bear Creek would be similar to that of most ephemeral streams in the area. TDS concentration ranges from 140 mg/l for snowmelt over frozen ground, to 2,330 mg/l for near-base-flow conditions. Water composition is mostly sodium sulfate and sodium magnesium sulfate.

Alluvial Valley Floors and Floodplains

Alluvial valley floors (AVF) have been preliminarily identified along Mud Springs Creek and Bear Creek. Office of Surface Mining (OSM) and Department of State Lands determination of the existence and extent of these potential AVFs will have to be made prior to mine permit approval.

A small portion along the eastern edge of this tract falls within the 100-year floodplain of Bear Creek. It has not yet been determined though, whether there is a substantial threat of loss of life or property.

VEGETATION

The Mud Springs coal tract consists of approximately 7,720 surface acres. Of that, 7,144 surface acres (92.55%) of the area is rangeland. The balance is 576 acres (7.45%) of cropland. See Table MS-1. The rangeland consists of four dominant range sites. These range sites in acres and percentage of the coal tract are grazeable woodlands 1,665 (23%), clayey 1,149 (16%), shallow clay-shallow 1,071 (15%), shallow 698 (10%). Other range site complexes total 2,561 acres (36%) of the coal tract. Within these range sites, there are varying production yields (pounds per acre) and condition classification. The grazeable woodland site produced 207 AUMs (13%), clayey 290 AUMs (18%), shallow

clay-shallow 202 AUMs (12%), shallow 218 AUMs (13%), and other range site complexes 722 AUMs (44%) of the coal tract. There are approximately 1,639 AUMs being produced per year on the coal tract in its present condition.

AGRICULTURE

There are approximately 7,720 surface acres of land overlying public coal in the Mud Springs coal tract. In this area 27.68% (2,138 acres) of the area is suitable for agricultural cropland use (Class II through IV land). Only 5.85% (452 acres) is currently utilized as cropland. In addition 1.80% (124 acres) of Class VI and VII land is currently utilized as cropland, which should have been left in native rangeland due to salinity, wind or water erosion or other problems. The balance of the land is Class VI through VIII, which is best suited for rangeland.

Agricultural operations in the area are mainly livestock with small areas of hay (alfalfa or grass-legume), small grains and tame pasture. (See Agricultural Land Use Table MS-1.) Hay or small grains are mainly grown for livestock feed during the winter months.

This area currently has 235 acres of Class II through III land (3.04% of the area) in hay, which produces approximately 233 tons per year under dryland conditions. About 219 acres of that amount could be or is irrigated and would produce approximately an additional 873 tons of hay per year.

Approximately 217 acres of Class II through IV land (2.81% of the area) is in tame pasture, which will provide approximately 211 AUMs per year under dryland conditions. There are 134 acres which could be or are irrigated and would provide an additional 1,289 AUMs. In addition 124 acres (1.60% of the area) of Class VI and VII land are in tame pasture, which will provide approximately 58 AUMs per year. This land is better suited for native rangeland.

Approximately 1,686 acres of Class II through IV land (21.86% of the area) are not presently cropped, but are suitable for cropland. This land could produce approximately 1,690 tons of hay or 13,668 bushels of wheat per year under dryland conditions. Wheat production is based on the assumption that 50% of the suitable cropland would be in summer fallow yearly.

About 498 acres could be irrigated and yield an additional 1,889 tons of alfalfa hay or 30,428 bushels of wheat. This land is currently utilized as rangeland.

OWNERSHIP AND LAND USE

Table MS-2 displays the ownership of surface and coal in the Mud Springs tract. Table MS-3 displays private surface ownership in the tract and the relationship between the landowners holdings in the tract to their ownership inside of a boundary approximately two miles outside the perimeter of the tract. (Note that this table does not portray the relationship of the landowners tract ownership to their total land holdings.) There are no energy-related landowners in this tract.

TABLE MS-2

OWNERSHIP OF SURFACE AND COAL IN THE MUD SPRINGS TRACT

	Acreage of Surface Owned	Acreage of Coal Owned		
		Leased	Unleased	Total
Private Landowners	7,720			
United States	—			—
State of Montana	480	480		480

TABLE MS-1
MUD SPRINGS COAL AREA
AGRICULTURAL LAND USE

PRESENT USE OF LAND	ACRES	PCT OF AREA	LAND CLASS 2/ CAPABILITY NON-IRRIGATED	LAND CLASS 2/ CAPABILITY IRRIGATED	PREDICTED AVERAGE YIELDS 1/ WHEAT DRY LAND (BU)	WHEAT IRRIGATED (BU)	BARLEY DRY LAND (BU)	BARLEY IRRIGATED (BU)	OATS DRY LAND (BU)	OATS IRRIGATED (BU)	ALFALFA DRY LAND (TON)	ALFALFA IRRIGATED (TONS)	TAME HAY DRY LAND (TONS)	PASTURE DRY LAND (AUMS)	PASTURE IRRIGATED (AUMS)
Privately Owned															
Cropped (Hay)	194	2.50	III	II	4,513	9,848	6,938	13,529	7,300	17,201	190	980	169	175	2,222
(Hay)	25	0.33	III	III	539	1,197	877	1,524	600	1,930	23	106	20	23	238
(Hay)	16	0.21	III	-	246	-	358	-	-	-	20	-	3	18	-
Total	235	3.04	-	-	5,298	11,045	8,173	15,053	7,900	19,131	233	1,086	192	216	2,460
Cropped (Tame Pasture)	2	0.03	II	-	52	-	68	-	160	-	3	-	2	3	-
(Tame Pasture)	78	1.01	III	II	1,832	3,943	2,830	5,243	2,113	6,826	74	402	68	70	863
(Tame Pasture)	56	0.72	III	III	1,246	2,604	2,016	3,388	700	4,130	50	231	48	50	546
(Tame Pasture)	38	0.49	III	-	634	-	904	-	80	-	52	-	26	45	-
(Tame Pasture)	43	0.56	IV	-	200	-	290	-	-	-	13	-	13	43	-
(Tame Pasture)	124	1.60	VI-VIII	-	-	-	-	-	-	-	-	-	-	58	-
Total	341	4.41	-	-	3,964	6,547	6,108	8,631	3,053	10,956	192	633	157	269	1,409
Total Land Cropped	576	7.45	-	-	9,262	17,592	14,281	23,684	10,953	30,087	425	1,719	349	485	3,869
Noncropped (Range)	47	0.61	II	-	1,222	-	1,598	-	3,760	-	71	-	47	71	-
(Range)	240	3.12	III	II	5,510	12,571	8,431	16,032	8,482	20,680	228	1,247	200	211	2,544
(Range)	258	3.34	III	III	5,544	12,330	8,986	15,880	5,500	20,010	232	1,102	207	232	2,470
(Range)	737	9.54	III	-	13,097	-	20,520	-	37,330	-	1,014	-	609	829	-
(Range)	404	5.22	IV	-	1,963	-	2,919	-	2,660	-	145	-	123	390	-
Total	1,686	21.83	-	-	27,336	24,901	42,454	31,912	57,732	40,690	1,690	2,349	1,186	1,733	5,014
Total Land Suitable and being Cropped for Cropland	2,262	29.28	-	-	36,598	42,493	56,735	55,596	68,685	70,777	2,115	4,068	1,535	2,218	8,883

1/ Cropland Suitable for Cropland and Average Predicted Crop Yield derived from published Powder River County Soil Survey Report, June 1971, Soil Conservation Service, Forest Service and Bureau of Land Management and data from Powder River County Agriculture Stabilization and Conservation Service.
2/ Land Class Capability derived from Powder River Country Soil Survey Report, published June 1971.

TABLE MS-3

SURFACE OWNERSHIP BY PRIVATE LANDOWNERS WITHIN THE MUD SPRINGS COAL TRACT AND THE RELATIONSHIP TO THEIR HOLDINGS WITHIN A TWO-MILE BOUNDARY

Owner Number	Acreage Owned in This Tract	Acreage Owned Over Federal Coal in This Tract	Percentage of Owner's Tract Holdings to His Holdings Within a Two-Mile Boundary
1	5,886	5,886	68
2	515	515	21
3	240	240	19
4	880	880	35
5	200	200	6

In 1979 and 1980 the BLM consulted the private landowners in the Mud Springs tract. The landowners either were in favor of coal leasing, had previously signed consent forms, or declined to specify preference.

This tract includes one occupied dwelling and a schoolhouse (Bear Creek School) that is currently in use. The tract is crossed by power distribution and telephone lines.

WILDLIFE

The bald eagle, as a winter migrant, and the golden eagle, as a summer resident, are known to use the area near the tract. No nesting or concentration areas occur on the tract. No other threatened or endangered species occur on the tract. Prairie dog towns within the tract were surveyed for the presence of black-footed ferrets during the summer of 1980; none were found (USDI 1982). Since those surveys are good for only one year, any mine plan developed for the tract would require resurvey for black-footed ferrets.

Antelope and mule deer use is scattered throughout the tract. No crucial use areas occur on the tract. Although there are a number of sage grouse and sharp-tailed grouse leks in the vicinity, none occur on the tract or within a mile of the boundary.

An analysis of the aquatic resources in the Otter Creek drainage (Morris 1982) showed that although there is no significant sport fishery in the area of the tract, care must be taken to protect the quality of the downstream waters which provide spawning habitat for various sport fish.

CULTURAL RESOURCES

A total of 960 acres, or 12.4% of the federally owned mineral estate, have been inventoried to Class III level. Five sites, one historic and four prehistoric, were discovered in the inventoried area. Unsuitability Criterion 7 has been applied to these sites. There was insufficient information to make a determination of eligibility to the National Register for three sites: 24 PR 403, 405 and 406. Two sites did not meet the criteria for eligibility: 24 PR 403 and 407.

Since only a portion of the tract has been inventoried, potential for finding more sites is high. Based on the ratio of sites to inventory in this tract, as many as 40 sites could be present on federal mineral estate.

RECREATION

Although this tract has legal access, it does not contain public land. Any recreation on this tract necessitates landowner permission to be legal. Hunting probably occurs on this tract, but there is no data available to determine the hunting pressure. The unit has no wilderness values or developed recreation facilities.

VISUAL RESOURCES MANAGEMENT

This tract contains numerous drainages. The major drainage, Bear Creek, has isolated stands of deciduous trees. The ridge tops have sparse to heavy stands of conifers that add to the vegetative variety of the tract. The southern part of the tract has a grassland biome and the northern part has a grassland-timber biome. Intrusions include ranch buildings, fences, cultivated fields, irrigation ditches and ranch trails. The tract has sandstone outcrops scattered throughout.

CLIMATE AND AIR QUALITY

Some climatic information is available from the Otter 9SSW weather station. This area is influenced primarily by a continental climate. Annual average precipitation in this area ranges from 15 to 16 inches. Forty-six percent of the precipitation occurs in April, May, and June. Greatest snow accumulations occur in January and February. Average snow depth in January is almost nine inches and in February slightly more than seven inches. Minimum monthly average temperature at Otter 9SSW is 20°F; maximum monthly average is 71°F. Average number of days between the last spring occurrence of 32°F and the first fall 32°F temperature is about 128 days at Broadus. Estimated potential evapotranspiration is 26 inches. Winds are predominantly from the west to north-northwest (35%) and the southeast to south (27%). Annual average wind speed is 10.2 miles per hour (mph).

Few geographic obstructions to dispersion of pollutants exist in this area. Dispersion is frequently hindered by such meteorological conditions as low mixing heights, low wind speeds, and no precipitation.

This tract's air quality is generally very good. Background level for suspended particulate was determined by PEDCo Environmental to be 20 micrograms per cubic meter (mcg/m^3), but annual geometric means range from 9 mcg/m^3 to 56 mcg/m^3. Gaseous pollutants are currently so low they are not even monitored.

One Class I area, the Northern Cheyenne Indian Reservation, exists about 20 miles northwest of this tract. Visibility in the area ranges from 45 to 70 miles with a median summer visual range of about 60 miles.

NOISE

Data on existing ambient noise levels for a specific area is typically non-existent, however, this area is expected to have noise levels commonly experienced in rural and rangeland area. Typical day-night sound levels for rural areas are estimated to be from 35 to 50 decibels (dBA) (DEIS for East Decker Coal Mine). A normal conversation is equivalent to 50 to 60 dBA. (Powder River FEIS Coal).

TRANSPORTATION

This tract is located approximately 35 miles south of U.S. Route 212 and 28 miles east of State Route 314 at Decker, Montana. A north-south gravel county road exists just inside the east boundary of the tract. Another county road exists east-west approximately three-fourth mile from the south border of the tract. The nearest rail line is 28 miles away at Leiter, Wyoming, or Decker, Montana.

SOCIOECONOMICS

Employment and Income

The area of Powder River County that includes the Mud Springs tract is predominantly an agricultural community, that has over the years changed little.

Utah International Incorporated owns nearly 7,500 acres of surface lands in the area. In addition, nearly 54,000 surface acres of adjoining lands, through a joint effort by area landowners, has been surface leased to Utah International Incorporated. These lands involve this proposed tract.

The county's market value of all agricultural products sold in 1978 was $18,831,000. The average value per farm/ranch was $54,426, which is approximately $6,000 more than the state average per farm. Cattle ranching produced approximately 15.5 million dollars, while wheat and hay cropland production produced approximately 3.3 million dollars.

Powder River County experienced a 13.1% gain over the decade of the 1960's and a 13.5% loss over the decade of the 1970's. (See Table MS-4.)

TABLE MS-4
POPULATION OF POWDER RIVER COUNTY

		Percent Change
1960	2,485	.0
1970	2,862	+13.1
1980	2,520	-13.5

This population loss can be primarily attributed to oil and gas activity that departed from the county.

Powder River County's employment picture shows a decline of agricultural employment for the years 1975 through 1980. Major increases can be seen in the mining and state and local government sectors of the economy. (See Table MS-5.)

TABLE MS-5
POWDER RIVER COUNTY EMPLOYMENT SECTORS

	1975	1976	1977	1978	1979	1980
Total Employment	1,238	1,244	1,245	1,276	1,337	1,348
Farming	200	173	146	147	175	168
Mining and Oil & Gas	73	77	78	91	99	112
State and Local Government	175	190	268	229	257	257

In 1975, direct farm employment in the county accounted for 16% of total employment. By 1980 that percentage had dropped to 12.4%. Mining, which includes oil and gas activity, increased from 5.9% in 1975 to 8.3% in 1980. State and local government increased from 14.1% in 1975 to 19.0 in 1980.

Per capita income increased from $4,206 in 1975 to $9,092 in 1980. The state per capita in 1980 was $8,652. The contribution from the mining sector, including oil and gas, has helped to increase the per capita income of the county over the years.

Community Facilities

The Mud Springs tract is located in the southwestern part of the county. This area is thinly populated and has poor roads. Due to sparse population, most people, consumer goods and agricultural products move by roadways. The road network is not well developed but is generally adequate for the existing population.

The closest major shopping center for the area is Sheridan, Wyoming. With some road upgrading, Broadus could contribute, but the present road network does not make it very attractive.

The Northern Cheyenne and Crow Indian Reservation economics are based on jobs provided by the tribal government and federal programs. There has been a slow shift from a subsistence to a cash economy, but most households still rely on hunting and gathering to supplement their incomes. Chronic unemployment is a serious problem.

A loose network of county and Bureau of Indian Affairs roads provides ranchers and rural residents access to the primary and secondary road systems. These are mostly gravel surfaced, with curves and grades conforming closely to the existing terrain. (Montco Mine EIS draft.)

Existent Attitudes

Several surveys over the past five years in the area have shown, on a fairly consistent basis, that most of those interviewed are in favor of mineral development. A BLM study, conducted in 1979-1980, showed the principal

reasons for supporting development are national energy needs and economic growth of the region. The study also showed respondents were in favor of mining controls.

Although it is not now possible to state the amount of population influx resulting from a new mine, there are two characteristics of the likely population that can be predicted. First, it would be in the 19-35 year age range and secondly, it would have quite different occupations than generally found in the region.

The younger aged population would also bring with it different lifestyles in some respects from those of the long-term residents. However, there is no reason to believe potential conflicts between lifestyles cannot be reconciled.

One of the most important changes in community organization occurring with the influx of new population, particularly in rural towns, is a change from informal, interpersonal relations and organization to more formal and institutional types of relationships. The longstanding friendships between long-time residents would be maintained, but become a much smaller part of the total community.

The population increase could well transform the community from a small rural to a small urban community. (Powder River Management Framework Plan, BLM, Nov 1981.)

CHAPTER II
ENVIRONMENTAL CONSEQUENCES

GEOLOGY AND TOPOGRAPHY

Geology

Within the mined area, the overburden and highwall reduction zone strata would be destroyed. The replaced spoils composition would be more homogenous than the present strata.

The Anderson, Dietz and Canyon seams would be removed. This would preclude future use of this resource. Other stratigraphically higher coals within the mined area would be destroyed. Lower coal seams would be precluded from surface mining under existing reclamation laws.

Strata below the mined seams would be undisturbed. Oil and gas exploration or development would be precluded during the active mining phase. Potential delays in oil/gas exploration/development during active mining would be insignificant.

Scoria would be removed during mining. Some scoria would be utilized for mine haul roads and other ancillary activities.

Within the spoils any paleontological resources would be at least partially destroyed. The remaining fossil material would be repositioned with the replaced spoils.

TOPOGRAPHY

Postmining relief would be more rounded than current relief. The average Anderson overburden is 106 feet. The 33 foot thick Anderson has a gross overburden ratio of about 1:3.2. A common spoil coefficient of expansion is 1.18. Removing 33 feet of Anderson seam coal then replacing 106 feet of spoils would result in an average mined elevation change of about minus 14 feet.

SOILS

Soil impacts from mining activities include: displacement of soil from wind and water erosion, change in soil structure and natural fertility, salt migration through the soil profile after reconstruction, and significant problems in revegetation and stabilization on steep slopes.

Disturbances of the soil would result in alterations of soil structure and porosity. This alteration would affect permeability, infiltration rates, soil-air and soil-water relationships and bulk density. The natural fertility would be affected by disruption of the nutrient cycle and a decrease in organic matter content within the soil.

The soil mapping units in the Mud Springs coal tract were evaluated for suitability of soil material for plant growth using USDA/SCS guidelines for "Soil Reconstruction Material for Drastically Disturbed Areas" [NSH 403.6(a)]. These results are expressed as acre feet of soil material having good, fair and poor suitability due to its physical and chemical properties. This showed 7% (2,342 acre feet) rated good, 45% (14,533 acre feet) rated fair and 48% (15,401 acre feet) rated poor as to suitability for plant growth (Table MS-6).

The wind erosion potential for the tract is rated as 52% low, 48% moderate and 0% high and the water erosion potential is rated as 21% low, 47% moderate and 32% high.

Areas with better or poorer reclamation potential may occur within the tract. Suitable overburden materials, if available, could be used to provide additional soil depth to provide for more adequate reclamation. Current information demonstrates that this area has fair to poor potential for successful reclamation.

WATER RESOURCES

Groundwater

Removal of coal and overburden within this tract would eliminate the wells and stock ponds that currently exist. The resulting pit would act as a well and intercept groundwater flow, which would be pumped back to surface ponds and eventually stream channels. A surface mine in this area that penetrated the Anderson seam alone, if approximated by a well one-half mile in radius, would initially intercept water at a rate of about 0.67 cfs. This flow would gradually

TABLE MS-6
MUD SPRINGS SOIL RECLAMATION ASSESSMENT

Mapping Unit Symbol	Mapping Unit Name	Acres	Pct. of Area	Pct. Slope	Erosion Potential From Wind	Erosion Potential From Water	Suitability of Soil Material for Plant Growth (acrefeet) Good	Fair	Poor
Ab	Arvada - Bone	26	<1	0-4	Low	Moderate	-	-	130
Ca	Delpoint-Yamac-Cabbart	1143	15	8-25	Moderate	High	263	1577	2515
Ce	Yamac-Delpoint	43	1	4-8	Low	Moderate	20	73	123
Ec	Delpoint-Yamac	27	<1	2-4	Low	Moderate	10	46	79
El	Delpoint-Yamac	282	4	4-8	Low	Moderate	104	482	823
Eo	Delpoint-Ocean Lake	20	<1	8-15	Moderate	Moderate	5	24	38
Fd	Farland silt loam	49	1	2-4	Low	Low	21	82	143
Fe	Farland silt loam	2	<1	4-8	Low	Moderate	1	3	6
Fl	Farland-Rock Outcrop	1	<1	0-6	Low	Moderate	-	2	2
Fm	Farland-Havrelon	2	<1	4-8	Low	Moderate	1	6	3
Fn	Fergus-Relan	462	6	2-8	Low	Low	286	1007	1021
Fo	Fort Collins silt loam	10	<1	0-2	Low	Moderate	3	47	-
Fr	Fort Collins silt loam	27	<1	2-4	Moderate	Moderate	9	126	-
Ge	Gilt Edge silt loam	4	<1	2-6	Low	Moderate	2	-	18
Hc	Haverson silt loam	28	<1	0-2	Low	Moderate	-	140	-
Hd	Haverson silty clay loam	3	<1	0-2	Low	Moderate	-	15	-
Hf	Haverson, channeled	200	3	0-4	Low	Moderate	-	1000	-
Hg	Haverson, saline	27	<1	0-4	Low	Moderate	-	-	81
Hh	Heldt silty clay loam	137	2	0-2	Low	Low	-	685	-
Hk	Heldt silty clay loam	39	1	2-4	Low	Low	-	195	-
Hm	Heldt silty clay loam	30	<1	4-8	Low	Low	-	150	-
Ho	Hesper silty clay loam	105	1	2-4	Low	Moderate	-	52	473
Hp	Hesper silty clay loam	173	2	4-8	Low	Moderate	-	86	779
Hs	Hopley-Relan loam	236	3	4-8	Low	Moderate	382	323	295
Hu	Hydro silty clay loam	24	<1	2-4	Low	Moderate	-	10	110
Hv	Hydro silty clay loam	8	<1	4-8	Moderate	Moderate	-	3	36
Hw	Hydro-Arvada	77	1	2-8	Low	Moderate	25	-	360
Md	McRae silt loam	19	<1	2-4	Low	Moderate	8	87	-
Mf	Kobar silty clay loam	15	<1	4-15	Moderate	High	-	67	3
Mg	Yamac-Delpoint	1139	15	4-15	Moderate	Moderate	467	1663	3075
Mw	Delpoint-Cabbart-Yawdim	622	8	15-35	Moderate	High	50	964	1008
Mt	Kobar silty clay loam	631	8	4-15	Moderate	High	-	2821	114
Nh	Birney-Cabbart	28	<1	8-15	Low	Moderate	1	33	61

TABLE MS-6 (cont.)
MUD SPRINGS SOIL RECLAMATION ASSESSMENT

Mapping Unit Symbol	Mapping Unit Name	Acres	Pct. of Acres	Slope	Erosion Potential From Wind	Erosion Potential From Water	Suitability of Material for Plant Growth (acrefeet) Good	Fair	Poor
Rc	Rapalje silt loam	3	<1	2-8	Low	Moderate	1	14	-
Rh	Relan-Cabba	1	<1	4-8	Low	Moderate	1	1	2
Rk	Relan-gravelly variant	1	<1	4-8	Low	Moderate	-	2	3
Rn	Remmit fine sandy loam	38	1	4-8	Moderate	Moderate	38	101	50
Ro	Remmit Ocean Lake fine sandy loam	63	1	8-25	Moderate	Moderate	41	124	67
Rs	Birney-Kirby	678	9	20-50	Low	Low	163	427	1681
Rt	Birney-Kirby-Cooers	535	7	4-70	Low	Moderate	198	455	1461
Rv	Ringling-Relan	440	6	6-25	Low	Moderate	238	475	678
Te	Terrace Escarpments	33	1	-	*-	High	-	21	89
Tm	Thurlow silty clay loam	148	2	2-4	Low	Low	-	740	-
To	Thurlow silty clay loam	136	2	4-8	Low	Moderate	-	397	61
Vr	Vona fine sandy loam	5	<1	4-8	Low	Moderate	4	7	13
							2,342	14,533	15,401
	Totals	7,720	100						
	Percent of Acre Feet						7%	45%	48%

*Too variable to rate

diminish to less than 0.1 cfs. If the mine penetrated one or two other coal beds, more than twice as much water would probably be produced by the mine. Drawdown caused by this dewatering could affect wells and springs in areas adjacent to this tract.

Spoil material placed back in the pit would result in elevated TDS concentrations of water that would recharge and pass through the spoils. This effect would begin to decrease after equilibrium is reached and is generally considered to be localized in extent. Spoil water would not be preferred for human consumption and irrigation, but would probably be suitable for livestock. Unaffected deeper aquifers would continue to be available as replacement sources of groundwater.

Surface Water

Surface water would be affected by surface mining primarily during the mining period, when existing drainage patterns in parts of the area would be displaced, runoff would be intercepted, and existing reservoirs would be removed from the mined area. Since alluvium is likely to be drained by mining, ephemeral streamflow may be slightly reduced as water infiltrates to the alluvium.

Channels might have to be diverted around the mine pit to carry their natural flows. The channelization could decrease annual and low flow rates because of seepage loss to the pit. Peak flows should be somewhat reduced. Two reservoirs off-site could be affected by mining. Channelization of stream courses could cause increased flow velocities, and the release of production water, including mine drainage, could alter the flow characteristics of streams. Erosion and sedimentation might increase during construction and operation of the mine, after the removal of vegetation and before its reestablishment of reclaimed areas.

VEGETATION

If the range were in excellent condition (76%-100%) and the entire area were mined, there would be an approximate loss of 1,896 to 2,600 AUMs. However, in its present condition, the loss would be approximately 1,639 AUMs.

Mining of the area would temporarily eliminate opportunities for domestic livestock to occupy the surface and to utilize the forage. However, vegetative production may be better after mining (due to extensive reclamation work) and the area may produce more than the current number of AUMs per acre. There is, however, no evidence that the plant community that ultimately evolves would support higher levels of livestock grazing than the premining vegetation supported.

Additional impacts resulting from vegetative disturbances would be: (a) possible reduction of the visual aesthetics, (b) increased soil erosion, and (c) reduction in the amount of wildlife and livestock forage.

AGRICULTURE

If the area is mined, there would be approximately 2,138 surface acres suitable for cropland that would be lost for the term or part of the term of mining and reclamation operations. This land could produce approximately 18,299 bushels of wheat (based on 50% land, summer fallow; 50% land, wheat) or 2,115 tons of hay annually under dryland conditions. There are 851 acres suitable for irrigation that could produce an additional 3,271 tons of hay or 52,085 bushels of wheat annually. However, only 452 acres (21.14%) of the suitable cropland is currently utilized as cropland. There are 124 acres of Class VI and VII land presently in tame pasture that is best suited for native rangeland.

OWNERSHIP AND LAND USE

As a result of leasing, industrial activities would be introduced into an area that has had no like activity. There is little ability to support such activities without the construction of major facilities. Impacts would be caused by the actual mine, construction of mine facilities, construction of new access roads, relocation and upgrading of existing access roads, possible construction of a railroad, and relocation and construction of telephone and power distribution lines. One occupied dwelling and an operating schoolhouse located on the tract would have to be relocated if the tract is mined. Approximately four miles of a gravel county road that crosses the tract would be relocated and would disturb 48 acres, assuming a 100-foot right-of-way. If a railroad is required to haul coal from the tract, it would disturb approximately 339 acres, assuming a 28-mile length and a 100 foot right-of-way.

WILDLIFE

If this tract were mined, there would be no significant impact on any threatened or endangered species. Part or all of at least two prairie dog towns would be destroyed if the tract were mined. Black-footed ferret surveys would have to be repeated on the tract. There would be no significant impact on any other State species of special concern if the tract were mined.

Poaching and road kills have increased dramatically in areas of Montana, Wyoming and Colorado where energy development has occurred. The problem is compounded in areas where shift changes coincide with feeding periods, especially big game (Streeter, et al 1979). The same would probably occur in this area.

If mining degrades water quality in Otter Creek, there would be reduced spawning success of game fish in the lower reaches of the creek.

CULTURAL RESOURCES

Under the proposed mining action, the destruction of all cultural sites would result in the mine area and an adverse effect on sites immediately adjacent from haul roads, vehicle traffic and soil erosion. Prior to mining, the remaining mine area would have to be inventoried to Class III specifications. The exception to Criterion 7 for unsuitability would be applied and eligible sites mitigated through data recovery, pending consultation with the State Historic Preservation Officer.

RECREATION

Mining this tract would effect deer and sharp-tailed grouse hunting because of the loss of habitat. The most significant impacts would be off-site, because of an influx of personnel associated with construction and mining. Several miles east of the tract lies BLM administered land and less than a mile north of the tract lies the Custer National Forest.

VISUAL RESOURCES MANAGEMENT

Mining would completely change the tract's visual characteristics. Additional intrusions would include shops, powerlines, communication lines, additional roads, overburden material, mining equipment, waste disposal and other structures associated with construction and mining. Many of these intrusions would be visible from the public road located near the eastern boundary of the tract. These intrusions would be especially visible because this is a rural area which does not have any nearby industrialization.

Mining this tract would create new contrasts, horizons and forms not associated with this area. Land disturbances in the northern part of the tract would detract from the current aesthetic values, because the buttes and ridges with their varied vegetation would be destroyed. The tract has Class B and C scenery with Class C being predominant.

CLIMATE AND AIR QUALITY

Impacts on climate from the proposed action would be localized and insignificant. Reclamation would mitigate any impacts, over the long term, that surface modifications could cause to climatic conditions.

North Decker is one of the closest areas to this tract that has been modeled for air quality impacts and is used as an estimate of what would happen here. More detailed and site specific air quality data for this tract will be forthcoming from a study underway by PEDCo Environmental. A more accurate prediction of impacts to air quality will be included in the study results.

During full coal production, the highest annual average ambient concentrations of total suspended particulates (TSP) for locations off the mine site were estimated to be 30 mcg/m^3 for the North Decker tract. This included the 20 mcg/m^3 background concentration. The Montana standard is 75 mcg/m^3.

Montana also has a 24-hour standard of 200 mcg/m^3 that cannot be exceeded more than once a year off the mine site. With the background concentration added, the second highest 24-hour values for TSP with the proposed action during full coal production would be as high as 52 mcg/m^3 for North Decker.

Visibility reductions resulting from the second highest 24-hour concentrations would be a maximum of 0.1 mile.

Application of best available control technology must be a part of any mining activity. Without these controls, concentrations would be increased dramatically.

NOISE

Effects of mining-related noise are generally confined to the mining and adjacent areas and have little impact elsewhere (Colstrip Project DEIS, Vol. 1). Noise sensitivity for the land uses that would be affected in this area, namely mining and grazing, have been rated as insensitive (Mestre and Wooten 1980).

Besides blasting, the greatest mining noise would emanate from the truck and shovel operation of coal removal and transport. The combined noise level of one coal loading shovel, one coal drill, three coal haulers, and three bulldozers would be 96.7 decibels, A-weighted (dBA), at a distance of 50 feet. This is estimated based on all pieces operating simultaneously and measured from one point (DSL 1982). A noise level of 90 dBA can be tolerated for eight hours without a risk of hearing loss (Mestre and Wooten). A sound level of 98 dBA would be reduced by distance alone to about 46 dBA at a distance of about 3.6 miles. According to a "Trend of Public Reaction to Peak Noise Near Residences" (Mestre and Wooten), noise levels up to 67 dBA are accepted with complaints rare. Sound levels may exceed 110 dBA during blasting (East Decker Coal Mine DEIS). A noise level of 110 dBA can be tolerated for up to one-half hour per day before there is a risk of hearing loss.

Effects of mining noises on animals is often that of dispersing them into areas away from the mine site. Experience is showing, however, that animals do become accustomed to the mine and return to reclaimed areas with the mine still in operation. Western Energy Company has an established sharp-tailed grouse lek on one of their reclaimed areas and they often see deer frequenting the site. Indeed some researchers have complained of the nuisance wild animals can be in revegetation attempts (Schwarzkoph 1982).

TRANSPORTATION FACILITIES

If the tract is mined, approximately four miles of the Bear Creek road would have to be relocated. The portion of this road north of the tract and the gravel road south of the tract would have to be upgraded to handle increased traffic to the mine. New access roads would be constructed to tie the existing roads into the tract. A railroad, if required, would be built 28 miles to Leiter, Wyoming, or Decker, Montana.

SOCIOECONOMICS

Economics (Agriculture)

Coal development displaces some agricultural production. To evaluate this issue, it is necessary to compare the value of the agricultural production displaced with that of the coal which could be developed. The trade-off was compared two ways.

One way was to compare the net national value of agricultural production displaced with the net national value of coal produced. In this evaluation, it was assumed the net value of coal is 12.5% (minimum royalty rate) of the assumed market rate for coal of $10 per ton. The net value of agricultural production is the cash rent to the landowner. A "worst case" situation was assumed for agriculture, that is, the area would not be reclaimed. Since agricultural production would be lost on each acre, year after year, these losses were totalled to show losses in perpetuity. By comparison, coal output per acre would be gained only once. To place agricultural production and coal on the same time basis, it was necessary to discount the value of agricultural output lost in future time periods. Regardless of inflation, a loss in agricultural production in the future is worth less than if it were lost today because of the time value of money.

Under these assumptions, Table MS-7 shows the return to national income from coal production would be over 1,458 times greater than agricultural production.

Another way of comparing the trade-off between coal and agricultural resources is to determine what coal would have to sell for to equal agricultural production displaced. This avoids assuming all coal in the area could be sold for the going market value. Table MS-7 shows that coal would have to sell for only $.00086 per ton to be equal to the net agricultural value displaced.

Concern has been expressed that extensive strip mining could have an effect on the supply of agricultural land and, thus, the national food supply. To gain a perspective on this issue, the value of agricultural production to be potentially displaced by mining can be compared with the value of agricultural output in the consideration area. Table MS-8 shows mining of the federal coal in the consideration area in Powder River County could displace 0.32% of the county's agricultural production, which had a value in 1978 of $18,831,000.[1]

Regional Economics

Due to the uncertainty of the market for coal, it is not possible to display exact tonnage figures, employment figures and time frames for this proposed mine. If this tract is sold at a future coal lease sale, county commissioners and community leaders of all possible impacted communities should establish communications with the lessee at the earliest opportunity. This communication would enable leaders to have access to more exact figures and time frames. The coal company must apply for a permit to mine by furnishing a proposed mining plan to the Montana Department of State Lands. Upon approval of a final EIS, a permit is issued.

Due to the location of this coal tract, a great deal of upgrading of existing roads in Powder River and Big Horn Counties and possible construction of new roads would be required before mining could commence. These roads would be required to haul heavy equipment and supplies to the area plus providing safe and dependable roads for workers.

The construction of mine facilities can be done in a two-year time frame. To support an assumed typical seven million tons per year operation, the construction work force would require approximately 315 workers. After the mine is opened, it is estimated it would require 210 operational miners.

[1]1978 Census of Agriculture, June 1981. U.S. Department of Commerce Bureau of Census Washington D.C.

TABLE MS-7

COMPARISON OF VALUE OF AGRICULTURAL PRODUCTION DISPLACED TO VALUE OF COAL PRODUCTION

	Agricultural Production						Coal Production						
County	Crop	Acres	Annual Ag Production	Net Value Per Unit	1/ Total Annual Net Value $	2/Total Present Value at 10%	3/ Per Acre Loss If Mined	Federal Acres	Recoverable Tons/Acre	4/Net Value Per Ton $	5/Total Present Value 10^3	6/ Ratio to Ag Prod.	7/ Value per ton to equal Ag. Prod.
Powder River	Hay	235	233 tons	$20 ton	$4,660	$ 46,600							
	Tame Pasture	341	269 AUMs	$10 AUM	2,690	26,900						1,458 to 1	
	Range-land	7,144	1,639 AUMs	$10 AUM	16,390	163,900	$30.75	7,720	35,880	$1.25	$346,240		$.00086
	TOTAL	7,720			$23,740	$237,400							

1. Annual agricultural production x net value per unit
2. Total present value discounted at 10%
3. Total present value/total acres
4. 12.5% x assumed value of $10.00 per ton at mine mouth
5. Acres x tons/acre x net value per ton
6. Total present value (coal)/total present value (agriculture)
7. Agricultural production per acre loss if mined/tons per acre

TABLE MS-8

COMPARISON OF COAL TRACT ANNUAL AGRICULTURAL PRODUCTION
TO COUNTY TOTAL AGRICULTURAL PRODUCTION

	HAY			CATTLE					
County	Annual Production (Tons)	1/ Annual Sales $	Percent of County Sales	Annual Production (AUMs)	2/ Annual Sales	Percent of County Sales	3/ Gross Annual Agr. Sales by Coal Area	4/ Gross Annual Agr I Sales by County	5/ % of County Agr I Production Displaced
Powder River	233	$12,815	.068	1908	$47,700	.25	$60,515	$18,831,000	0.32

1. Tons x $55 = value of annual sales
2. AUMs ÷ 12 AUM/Cow = cow units x 300 sales per cow unit = value of annual cattle production
3. Total of two annual sales columns
4. 1978 Census of Agriculture, Department of Commerce, US Printing Office, Washington, DC, June 81
5. Value of production displaced as a percentage of all agricultural production in the county

CHAPTER III
PRELIMINARY FACILITY EVALUATION REPORT

INTRODUCTION

The primary use of Powder River Basin coal is for burning in steam generating plants to produce electricity. Large amounts of coal are exported from Montana and Wyoming to midwestern and southern electric utilities for this purpose. Electric generating facilities do exist in the Powder River Basin at Colstrip and Billings, Montana, and Gillette, Osage and Glenrock, Wyoming.

In submitting their expression of leasing interest for a possible 1984 coal lease sale, Utah International indicated the possible coal end use would be for two 450-megawatt electric generating facilities to be located on site. This was a change from past company indications that development in the Moorhead area would be geared to synfuels.

The Powder River Regional Coal Team, in its considerations of leasing federal coal, will address the likely coal end-uses and their implications to determine the most probable major impacts of development.

Because of the uncertainty of actual end-use facilities which may evolve, this report will be generic in nature. It will attempt to provide additional information on expected impacts to be used in decisions concerning the leasing of federal coal and should not prejudice any later decisions. It is not meant in any way to substitute for site-specific evaluations, EIS's, or analyses which occur when mining and facilities projects are actually proposed.

ASSUMPTIONS AND VARIABLES

The following basic assumptions were made to assess impacts of facilities construction. These assumptions were made based on existing literature, facilities, and best estimates:

1. There would be two generating plants of 450 megawatts each.
2. Total construction would occur over a four-year period.
3. The power plant and associated facilities construction work force would peak at 2,800 employees. Permanent work force would be approximately 200 people. These figures do not account for workers needed to build support facilities such as housing, roads and transmission facilities.
4. Total land area dedicated to the electric power generating facility would be approximately 600 acres. This would include the power plant, coal handling facilities, cooking water, air pollution control facilities and administration.
5. Cooling water would probably be obtained from the Powder River, where Utah International has a water reservation.
6. A definitive plant site will not be located, although it is assumed it would be constructed adjacent to or near the tract. Generic impacts predicted would occur regardless of where the facilities were to be developed in the area.

ENVIRONMENTAL CONSEQUENCES

Soils, Vegetation, Agriculture

In the Mud Springs tract area, rangeland is the predominant use of the surface. Siting a 600-acre generic electric generating plant in an adjacent area would preclude an annual production of approximately 138 AUMs if the site were 100% rangeland. Assuming a similar distribution of soils as found in the Mud Springs tract, 27.7% (166.2 acres) would be Class II through IV soils suitable for cropland. These soils could produce under dryland conditions 1,422 bushels of wheat per year (assuming 50% of land, summer fallow; and 50% of land, wheat) or 164 tons of hay. This production, in a "worst case" analysis, would be lost for the life of the facility.

Erosion losses due to wind and water from ground disturbed during the construction phase of the facility, given State permitting stipulations, would be insignificant. Regionally, the agricultural production foregone on the 600 acre facility site also would not be significant. Because of the highly buffered soils in the tract area and downwind, no significant impacts to soils are expected should acid rains occur.

WATER RESOURCES

Water requirements for an electric power generating facility are approximately 9,000 gallons per minute or 13,000 acre-feet per year. The likely source of water for industrial use is the Powder River. This quantity of water represents about 3.9% of the Powder River's annual average discharge. Facility wastes of ash and sludge and water disposed of in the mine do have the potential to degrade water quality if they are disposed of within the saturated zone which develops upon reclamation. Present regulations require state approval of disposal sites.

OWNERSHIP AND LAND USE

Construction of a power generating facility would cause displacement of existing uses by new uses and an increase in the intensity of industrial activities in the area. Approximately 600 acres near the tract would be required for the complete power generating facility, therefore existing ranching or agricultural uses would be displaced.

Construction work force would peak at an estimated 2,800 personnel over a four-year period and therefore would cause a need for housing and community services. This need would taper off when construction is completed, since the permanent work force would be approximately 200. While some of this need would be filled locally, possibly by building a new town, most of it would probably be satisfied in Ashland, Montana, or Sheridan, Wyoming, 40 and 55 miles distant, respectively. At present, Ashland does not have the resources to absorb an influx of people. Sheridan is better equipped to handle expansion, since it is a much larger city and has previously absorbed population influxes caused by coal mining.

Traffic on the access roads serving the site would be greatly increased from commuting workers and would require that these roads be upgraded (possibly paved) to handle it.

RECREATION

Recreation on the tract and immediate vicinity is limited primarily to deer and bird hunting. The Custer National Forest, private lands and surrounding public lands would receive additional pressure for recreation activities because of increased population. Developed recreational facilities do not exist in the area.

VISUAL RESOURCES MANAGEMENT

The power plants and powerlines would create a sharp contrast with the existing landscape. The visual impact would be the penetration of the skyline by the two 450-KV generating plants and accompanying powerlines. These structures would be visible from the public road located on the eastern boundary of the Mud Springs tract. The natural attractiveness of this area would be impaired because of the presence of the generating facilities and other structures related to mining.

The Buffalo Creek Wilderness Study Area (WSA) is located approximately 20 miles to the east of the site. Emissions from the power plants may affect the visual aesthetics of the WSA.

WILDLIFE

The impacts of a facility on wildlife in the Mud Springs area could occur in two areas: (1) impacts from destruction of habitat and (2) direct and indirect impacts from the increase in human population.

The removal of vegetation for the construction of the facility and for the expansion of urban areas and highways would reduce use of the area by wildlife, regardless of the type of vegetation removed. Bald eagles, golden eagles, prairie falcons, ferruginous hawks, upland sandpipers, antelope, mule deer, sage grouse, sharp-tailed grouse and prairie dogs, all occur in the area of the tract. Each one of these species must be given consideration in any facility siting plan.

If powerlines, pipelines, access and haul roads are constructed in key wildlife areas, partial or total destruction of habitat would occur depending on the magnitude of development. Wildlife would be impacted by eagle electrocutions on powerlines, migratory bird mortality from striking powerlines close to wetlands, road kills along transportation routes through important wildlife areas, harassment of wildlife by off-road vehicle use, increased poaching, as well as habitat destruction.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming and Colorado where energy development has occurred. The problem is compounded in areas where transportation corridors are located in important wildlife areas and shift changes coincide with wildlife feeding periods. This situation could occur in the Mud Springs tract area.

The lower reaches of Otter Creek provide an important spawning area for game fish from the Tongue River. In any facility siting plan, consideration must be given to maintaining the quality of the water in the Otter Creek drainage.

The impact to wildlife could be mitigated by: (1) siting the facilities with regard for critical wildlife areas, (2) adjusting work shifts to avoid feeding times of highly visible wildlife, (3) mass transportation of employees, (4) providing funds to state fish and game agencies to better control illegal shooting of wildlife, and (5) adopting a poaching clause in union contracts.

CULTURAL RESOURCES

Since only a portion of the Mud Springs tract area has been inventoried, the potential for finding more sites is high. Based on the sites to inventory ratio obtained to date, up to three sites would be expected in the siting of a 600-acre generic facility. Additional sites would be impacted with the construction of roads, pipelines, transmission lines and housing required to support the facility.

AIR QUALITY

An air quality modeling study of a generic coal-fired electric power plant in the Powder River Coal Region provided the Water and Power Resources Service with concentrations of major pollutants to expect with future coal development. The generic plant design was based on processes and technologies which are considered most likely to be in commercial use during the next 20 years. Their results show that in a clean background setting, no individual plant would threaten an ambient standard or Class II increment (Nordsieck 1981).

Presence of Class I areas are the greatest constraint to plant sitings. Under current air quality regulations, when a major polluting source is to be constructed, an impact area around that source must be designated for evaluating compliance with prevention of significant deterioration (PSD) requirements (Driscolo 1982). An impact area based on specific plant location and technology would have to be designated to allow examination of possible conflicts with the Northern Cheyenne Indian Reservation Class I area and the Buffalo Creek WSA.

SOCIOECONOMIC

This coal tract could be used to support a mine mouth electrical power plant consisting of two 450 megawatt generators. There is adequate coal available to support this type of operation.

The location of this plant is unknown at this time, however, it would be in the vicinity of the coal tract. A typical plant would require 600 acres. This much area would normally support approximately 138 AUMs, which would be lost for the life of the power plant. This would be an additional loss of 0.02% of the county's agricultural production.

In addition, there may be some other losses of AUMs due to rights-of-way for transmission lines, water input lines and possible roads required to transport coal from the mine to the power plant.

A "worst case" scenario was assumed, in the above comparison, that the area would not be reclaimed. Existing state and federal laws require the lands to be returned to the approximate original contour and be reseeded to native species. Evidence collected on current reclamation efforts suggests postmining productivity is similar to premining productivity, at least in the short term. Long term results are yet to be evaluated as reclaimed lands have not been monitored over a long period of time.

Construction of a power plant can take four to eight years. If this plant is constructed in four years, it is estimated that the peak construction work force would be approximately 2,800 workers. This number plus the construction work force for the mine would cause a tremendous impact to the area. By comparison, the present county population is only 2,520.

Due to the size of this work force during the construction stage and the distance from established communities, it may be necessary to develop a new town in the area.

After construction of the plant, the estimated number of operational workers required is 200. This compounds the problem, because the needs for the large construction work force are diminished greatly when the miners and plant workers finally take over during the operational phase.

Their needs would be different in many cases. For example, house trailers could be used to support construction workers, whereas more permanent housing would be needed for the power plant and mine operational workers.

As workers come into the area, many would bring families. This would require additional schools. Medical facilities in the area would have to be expanded. Law enforcement agencies would be required to expand.

Some new secondary businesses would be established in the area to supply the needs of the workers. Secondary employment or local service employment in small communities is related to households and population. This is complicated by the fact that most local service workers do not represent new in-migration. These jobs are often filled by second job holders (wives, young people) in the base population or from among the families of in-migrating construction or operation workers. Such jobs have very beneficial economic impacts, since they add to family income without adding significantly to the population base.

Jobs for Indians from the Crow and Northern Cheyenne tribes would be enhanced if this tract were developed and a plant built. This would cause some increase in traffic on the reservation roads from workers residing on the reservation, however.

The total impact to this area cannot be accurately described at this time due to many unknowns. But when a peak of 3,200 workers come into a thinly populated area, the impacts would be great. This is why good communications must be established between the lessee and local government leaders at the earliest opportunity to properly plan for these impacts.

NET ENERGY ANALYSIS

A net energy analysis calculated by the BLM (W.O. IM 79-282) indicates that an average of 37.7 British thermal units (BTUs) would be expended to produce each pound of coal from the Mud Springs tract. In turn, a pound of coal would produce about 8,534 BTUs. The ratio of energy produced to that expended would be more than 226 BTUs to 1 BTU.

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APPENDIX
MUD SPRINGS UNSUITABILITY SUMMARY

UNSUITABILITY CRITERIA RESULTS

Criterion	Applicable to Tract	Exception Used	Additional Data Needed	Comments
1. Federal land systems	No			
2. Rights-of-way and easements	No			
3. Buffer zones for roads, buildings, etc.	Yes	No		Exception would be applied upon agreement between responsible parties
4. Wilderness study areas	No			
5. Scenic areas	No			
6. Land used for scientific study	No			
7. Historic lands and sites	Yes	Yes	100% inventory needed prior to mining	
8. Natural areas	No			
9. Federally listed endangered species	No			Prairie dog towns exist in tract and provide potential black-footed ferret habitat.
10. State listed endangered species	No			
11. Eagle nests	No			
12. Eagle roosts and concentration areas	No			
13. Falcon cliff nesting sites	No			
14. Migratory birds	No			
15. State high-interest fish and wildlife	No			
16. Floodplains	Yes			No area excluded until determination of threat to life or property
17. Muncipal watersheds	No			
18. National Resource Waters	No			
19. Alluvial valley floors	Yes		Actual determination of AVF extent	No area excluded. Determination would have to be made prior to mine plan approval.
20. State proposed criteria	No			

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRING COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
GEOLOGY AND TOPOGRAPHY					
Geology					
Leasables	Little gas/oil exploration, no development	No exploration or development during mining	Low	Good	
Saleables	2,000 acres scoria present	Some ancillary mine use	Low	Low	
Paleontological	Some fossil leaves, shells, petrified wood	Some paleo destruction, some stratigraphic rearrangement	Low	Low	
Topography	Rolling hills and gentle sloped flats	Lower terrain, gently sloping	Low	Low	
SOILS	Forty-five soil mapping units have been identified in the tract. These soil units may be found along drainages, fans, footslopes and ridges.	There would be displacement of soil by water and wind erosional forces; change in soil structure and natural fertility, and significant problems in revegetation and stabilization on steep slopes.	Moderate to high	Data reliability is 30% for the Powder River County Soil Survey. Better soils in the bottomlands are more accurately mapped than those on the rangelands and steep-sided slopes.	

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SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRING COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
WATER RESOURCES					
Groundwater					
Occurrence	Five stock or domestic wells in tract. Static water levels range from 5 to 106 feet.	Destruction of existing wells		There may be more wells in tract.	Supplies could be replaced by deeper wells at considerable expense.
Quantity	10 gallons per minute				
Conductance	3,488 to 5,400 micromhos per centimeter	Higher in reclaimed spoils aquifer		Good	
Dissolved solids	2,720 to 5,040 milligrams per liter	Higher in reclaimed spoils aquifer.		Good	
pH	7.1 to 7.8	Lower in spoils aquifer		Good	
Importance for homes or towns	Probably some domestic use.	Loss of present supply	Moderate		
Importance for industry	Nil				
Importance for livestock and wildlife	Primary use	Loss of present supply	Moderate		
Importance for agriculture	Nil				

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRING COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
Surface Water					
Occurrence	Ephemeral streams and 14 stock ponds	Interception of surface runoff and removal of reservoirs during mining.	Moderate		
Quantity	0.01 to 53 cubic feet per second				
Conductance	225 to 2000 micromhos per centimeter	Possible increase during mining.	Low	Good	
Dissolved Solids	140 to 2,330 milligrams per liter for Bear Creek	Possible increase during mining	Low	Good	
pH	7.0 to 8.4	Possible decrease during mining	Low	Good	
Importance for homes or towns	Nil				
Importance for industry	Nil				
Importance for livestock and wildlife	Primary use	Loss of some supplies during mining	Moderate		
Importance for agriculture	Some flood irrigation from Bear Creek	Unless protected could be decreased during mining	Moderate		

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRING CREEK COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
VEGETATION	Range Sites: (Acres) Grazeable Woodland 1,665 Shallow 698 Clayey 1,149 Sh. Clay, Sh. 1,071 Other 2,561 Total 7,144	Acres being disturbed: (Acres) Grazeable Woodlands 1,655 High Shallow 698 High Clayey 1,149 High Sh. Clay, Sh. 1,071 High Other 2,561 Low Total 7,144	High - - - - Long term elimination of the natural vegetation mosaic and species diversity	Good	Reclamation of Ponderosa pine not yet proven
Animal Unit Months	1,639 AUMs	High	Loss of 1,639 AUMS High	Good	
Animal Unit Months if range is in excellent condition					
76-100%				Good	76% 1,896 AUMs 100% 2,600 AUMs
Plant Facility AUMs Acres	138 AUMs 600 acres	High	Loss of 138 AUMs high	Good	76% 164 AUMs 100% 216 AUMs

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRING CREEK COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
AUMs if range is in excellent condition 76-100%					
Threatened Endangered or Noxious Species	There are no threatened or endangered plant species found growing in the tract. However, there are six noxious species found growing in the Powder River Resource Area, but it has not been determined if these species are found growing in the tract. The species are: A. Convolulus aruensis B. Cirsium arvense C. Euphorbia esula D. Centaurea ropens E. Cardaria draba F. Centaurea maculosa	Low	Low	Good May 16, 1980 Regional Director, Region 6 US FWS Denver, CO	

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRINGS CREEK COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
Reclamation Vegetation	On federal, state and private lands, the Office of Surface Mining (OSM) assures that the mining company establish a diverse, effective and permanent vegetative cover to standards set by the Department of State Lands of Montana and the federal Bureau of Land Management	Low	High-failure of reclamation, Low-success of reclamation	Good	
AGRICULTURE	2,138 acres suitable for cropland. 452 acres currently being cropped (235 acres, Hay and 217 acres, Tame Pasture). 124 acres class VI and VII land in tame pasture.	Maximum of 452 acres current cropland removed from production for term of mining and reclamation operations.	Low	Fair	
LAND USE	Ranching is primary use. One occupied dwelling and an operating school house are located on the tract.	Introduction of industrial activities. Land used for mine, mine facilties, roads, powerlines, and possibly railroads. Loss of occupied dwelling and schoolhouse	Moderate to high during mining. Low to none after reclamation.	Good	

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRINGS COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
WILDLIFE					
Mule Deer and Antelope	Scattered and limited use of tract	Insignificant	Low	Good	
Fish	Lower Otter Cr. provides spawning habitat for sport fish	None if water quality maintained		Good	
Threatened and Endangered Species	Bald eagle is a winter migrant through area	Insignificant	Low	Good	
Raptors	Golden Eagle nests in the general area	Insignificant	Low	Good	No nests on or near the tract
Prairie Dogs	Small towns on tract	Towns will be destroyed	Low-for area wide population	Good	
Grouse	Leks in the general area	None		Good	No leks on the tract
CULTURAL RESOURCES	960 acres inventoried (12.4%), 5 sites located	Disturbance and destruction of all sites within mine area, indirect effects to sites adjacent.	Loss of resource, loss of heritage values.	Limited to 12.4% of tract	Prior to mining the actual mine plan area would be inventoried and NRHP sites mitigated or avoided

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRINGS COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
RECREATION	Hunting is probably the only recreational activity on this tract. Hunting by permission only.	None on site. Most of impacts would occur off-site	Low	Adequate	
VISUAL RESOURCES	Tract Classified Class III	Disturbance of landscape. Visual intrusions would include traffic, buildings, roads, powerlines, etc.	High during the life of the mine. The classificaiton would be Class V during mining, but reclamation would restore the area to Class III	Fair	Little has been done in regards to VRM in this area
AIR QUALITY	Concentration of particulates estimated at 20 mcg/m^3 (Mt standard is 75 mcg/m^3).	Highest ambient concentration of particulates would be 30 mcg/m^3.	Low	Fair	
NOISE	Sources are wind, agricultural activity and vehicular traffic. Estimated noise level is 40dBA.	Substantial increase in noise due to blasting, equipment, and more vehicle and railroad traffic. Zones of increase to 50dB for 1/3 mile around tract, 1,000 feet from railroad centerline, and for 100 to 200 feet from access road centerline.	Insignificant	Good	There are no land uses in affected zones that are sensitive to high noise levels.

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRINGS COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comment
TRANSPORTATION	Existing access via gravel county roads. Low use and maintenance.	Increased traffic and access roads. Upgrading of present roads. Relocation of portion of Bear Creek road. Possible construction of rail spur.	Moderate to high	Good	Railroad would be unnecessary if planned mine mouth generating plant constructed
SOCIO-ECONOMICS					
Coal Mine	Agricultural production from 7,720 acres is 233 tons of Hay and 1,908 AUMs	Loss of agricultural production is 0.32% of county agricultural production	Insignificant	Good	
Employment	Small number employed in agriculture	Would require approximately 315 construction workers and 210 operational workers. Construction time is 2 years	Significant - High	Good	
Roads	Poor farm to market roads	Would require upgrading existing roads and/or possibly new roads in Big Horn and Powder River Counties	Significant - High	Good	

APPENDIX

SUMMARY OF RESOURCE AND ENVIRONMENTAL CONSIDERATIONS
MUD SPRINGS COAL LEASING TRACT

Element	Present Situation	Anticipated Effect of Leasing and Development	Significance of Anticipated Effect	Data Reliability	Comments
Power Plant	Agricultural Production is 138 AUMs from 600 acres	Loss of agricultural production is 0.02% of county agricultural production	Insignificant	Good	
Employment	Small number employed in agriculture	Would require approximately 2,800 workers for construction period of 4 years and 200 operational workers	The effect would be enormous during the construction phase. This in-migration would more than double present county population and would impact schools, medical facilities, law enforcement, and social needs	Good	There is a possibility that a new town will be required

UNITED STATES DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE

PART II

1984 Lease Sale — Coal

Summary Report — Mud Springs Tract
Northern Powder River Basin
Powder River County, Montana

North Central Region
Billings, Montana

November 1, 1982

TRACT SUMMARY REPORT

Minerals Management Service, North Central Region
Billings District
Billings, Montana

Date: November 1, 1982

TRACT DESCRIPTION

Tract Name: Mud Springs No.:

Coal Region: Powder River

State: Montana County: Powder River

BLM Resource Area and Planning Unit: Powder River Resource Area, Moorhead Planning Unit

USGS Quadrangle Maps: Bear Creek School, Hamilton Draw, Otter, Quietus

Legal Description: See Attachment A and Attachment B(Tract Location Map)

Known Recoverable Coal Resource Area (KRCRA): Northern Powder River

Tract Acres (by BLM)

Federal Uncommitted:	7720
Federal Committed:	0
State Committed:	480
Private (Fee):	0
Total Tract:	8200

Approximate Acres Underlain by Coal:

Federal Uncommitted:	7400
Federal Committed:	0
State Committed:	480
Private(Fee):	0
Total Tract:	7880

Estimated In-Place Coal Tonnage:

Federal Uncommitted:	632.9 MMT
Federal Committed:	0 MMT
State:	36.5 MMT
Private (Fee):	0 MMT
Total Tract:	669.4 MMT

Estimated Recoverable Coal Tonnage:

Federal Uncommitted:	277.0 MMT
Federal Committed:	0
State:	23.0 MMT
Private (Fee):	0
Total Tract:	300.0 MMT

ENTITIES EXPRESSING INTEREST

Utah International

COAL RESOURCE CLASS DESIGNATION

CLASS 1: Good

Confidence in resource estimates is good because the surface areas of category "A" and "B" resources cover two-thirds or more of the total surface area of the tract

CLASS 2: Moderate

Confidence in resource estimates is moderate because the surface areas of category "A" and "B" resources cover one-third to two-thirds of the total surface area of the tract.

CLASS 3: Poor

Confidence in resource estimates is poor because the surface areas of category "A" and "B" resources cover one-third or less of the total surface area of the tract.

POTENTIAL FOR DEVELOPMENT OF TOTAL TRACT
Mud Springs Tract

EVALUATION FACTORS	CLASS 1	CLASS 2	CLASS 3
Coal Resources	X		
Coal Quality		X	
Transportation			X
Minability		X	
Marketability		X	
Overall Class		X	

(See Attachment C for determination of other factors listed above.)

COAL RESOURCE CATEGORY DEFINITIONS

CATEGORY "A" RESOURCES

Resource quantity is estimated from data sources that are adequately spaced to assume, with a high degree of confidence, continuity between data points. The geologic character of the area is well defined. The resources for the Mud Springs tract in this category also meet the demonstrated reserves category of USGS Bulletin 1450-B.

CATEGORY "B" RESOURCES

Resource quantity is based on an assumption of continuity between data points with a lower confidence level than that of category "A" resources. The geologic character of the area is not as well defined as category "A" resources.

CATEGORY "C" RESOURCES

Resource quantity is based on an assumption of what can reasonably be expected to exist in the same producing region under analogous geologic conditions with a lower confidence level than that of either category "A" or "B".

POTENTIAL FOR DEVELOPMENT OF TOTAL TRACT

TOTAL IN-PLACE TONNAGE OF MUD SPRINGS TRACT

Coal Bed	Average Thickness	Resources (million short tons)		
		Category A	Category B	Category C
Anderson	33	174.4	---	---
Dietz	13	141.8	8.3	---
Canyon	25	329.7	15.2	---

Coal Rank: Subbituminous
Unit Weight: 1770 tons per acre-foot

IN-PLACE TONNAGE - FEDERAL UNCOMMITTED

TRACT: Mud Springs

Coal Bed	Average Thickness	Resources (million short tons)		
		Category A	Category B	Category C
Anderson	33	169.2	---	---
Dietz	13	131.8	8.3	---
Canyon	25	308.4	15.2	---

Coal Rank: Subbituminous
Unit Weight: 1770 tons per acre-foot

IN-PLACE TONNAGE - STATE

TRACT: Mud Springs

Coal Bed	Average Thickness	Resources (million short tons)		
		Category A	Category B	Category C
Anderson	31.5	5.2	---	---
Dietz	12.0	10.0	---	---
Canyon	25.0	21.3	---	---

Coal Rank: Subbituminous
Unit Weight: 1770 tons per acre-foot

OVERBURDEN/INTERBURDEN THICKNESS RANGES

The following coal beds are listed in descending order:

Anderson	overburden	- Min. 0 feet	Max. 260 feet
Dietz	overburden	- Min. 0 feet	Max. 200 feet
Anderson-Dietz	interburden	- Min. 50 feet	Max. 80 feet
Canyon	overburden	- Min. 0 feet	Max. 200 feet
Dietz-Canyon	interburden	- Min. 95 feet	Max. 180 feet

COAL GEOLOGY OF THE MUD SPRINGS TRACT

All the coal seams in the Mud Springs tract are in the Tongue River member of the Paleocene Fort Union Formation. These coals are the result of a massive accumulation of organic material in a backswamp adjacent to a northward-flowing river system (Flores, 1982), analogous to the modern day Mississippi River.

The minable beds in descending order are the Anderson, Dietz, and Canyon. All three seams are burned to a certain extent on the east side of the tract where the coal outcrops along the Bear Creek valley.

One northeast-southwest trending fault cuts the tract with displacements up to 160 feet. Otherwise, the structural geology of the tract is uncomplicated, with beds dipping less than 1° to the southwest.

There are no producing oil and gas wells in the area although several "dry" holes have been drilled. Several oil and gas leases exist in the area. Geologic hazards are not anticipated anywhere within the tract.

COAL QUALITY (As received)
TOTAL TRACT
(Values in percent, except BTU)

Coal Bed	Number of Samples	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulfur	BTU/lb
Anderson	2	25.18	31.77	38.95	4.13	0.31	8,534
Dietz	3	29.43	30.48	36.14	3.95	.39	8,164
Canyon	4	27.59	28.61	38.42	4.65	.34	8,214

Source: Matson and Blumer, 1973; MBMG, 1982)

(Coal quality for the Federal uncommitted and State coal is estimated to be the same as above)

All samples are from 1-5 miles outside the Mud Springs tract. The only analyses available within the tract boundaries were from core holes that sampled only a small portion of the total thickness of each coal seam. Therefore, these holes were deemed unusable.

POTENTIAL USE OF COAL: Mine mouth electrical generation or synfuel feed stock. Also has export potential.

TRANSPORTATION:

	Mode	Distance to Transportation Link
Existing		
Being Developed		
Being Planned		
None Planned	Rail	28 miles

Other: The expressor of interest has stated that no rail facilities would be needed

MINABILITY: (See Attachment D for Mining Engineering Assumptions)

Type of Mine: Surface operation using dragline and/or truck-shovel mining methods.

Estimated Recovery:

Based on current practices in the Powder River Basin coal field, a recovery factor of 90 percent is typical. The estimated recovery may or may not be achieved.

Estimated Annual Production:

Federal Uncommitted: 7.0 million tons

Total Tract: 7.5 million tons

Estimated Mine Life: Maximum of 40 years

Estimated Surface Acres to be Mined Per Year:

Federal Uncommitted: 185

Total Tract: 197

Active, Inactive, and Abandoned Mines or Leases in Tract Vicinity:

Three active surface coal mines are located approximately 28 miles to the west. No others are known to exist in the immediate vicinity of the tract.

MARKETABILITY

Considering one expression of interest, poor potential for transportation, good coal resources, and moderate coal quality and minability, the tract has moderate market potential.

OVERALL CLASS

Considering the above factors, the tract has been given a Class 2 potential for development (see table on page 2).

DEFINITIONS AND ASSUMPTIONS FOR THE MUD SPRINGS TRACT: See Attachment D

REFERENCES: See Attachment E

TRACT LEGAL DESCRIPTION

MUD SPRINGS

Principal Meridian, Montana

FEDERAL UNCOMMITTED	Acres
T. 8 S., R. 45 E..,	
sec. 4, lots 13 and 14, SW1/4, W1/2SE1/4, and SE1/4SE1/4;	360
sec. 5, lots 14, 15, and 16 and S1/2;	440
sec. 6, lot 18, E1/2SW1/4, and SE1/4;	274.57
sec. 7, lots 1 to 4, inclusive, E1/2, and E1/2W1/2;	619.16
sec. 8, All;	640
sec. 9, All;	640
sec. 10, W1/2 and W1/2SE1/4;	400
sec. 15, W1/2;	320
sec. 16, S1/2S1/2;	160
sec. 17, All;	640
sec. 18, lot 1, N1/2NE1/4, SE1/4NE1/4, NE1/4NW1/4, and E1/2SE1/4;	275
sec. 19, E1/2 and E1/2W1/2;	480
sec. 20, All;	640
sec. 21, All;	640
sec. 22, W1/2W1/2;	160
sec. 27, W1/2NW1/4;	80
sec. 28, N1/2;	320
sec. 29, N1/2;	320
sec. 30, lots 1 and 2, NE1/4, and E1/2NW1/4.	311.19
Total	7,719.92
Rounded Total	7,720

STATE COMMITTED	
T. 8 S., R. 45 E.,	
sec. 16, N1/2 and N1/2S1/2.	480
Tract Total	8,199.92
Rounded Tract Total	8,200

Attachment B

TRACT MAP
-Mud Springs-

Please see the tract map at the beginning of Part I.

DETERMINATION OF CLASSES
- Mud Springs Tract -

Coal Quality

The BTU content fell in the low range for Powder River Basin coals. Percent sulfur content was low. Other elements of the proximate analysis were in the normal range. The coal is, however, of a marketable quality and was rated as moderate.

Transportation

The tract is approximately 28 miles from the nearest railroad line, either at Decker, Montana, or Leiter, Wyoming.

Minability

Maximum stripping ratio and total overburden are comparable to mines operating in the area. The tract contains three minable seams. A moderate rating for minability was applied.

MINING ENGINEERING
DEFINITIONS AND ASSUMPTIONS
- Mud Springs Tract -

Deductions from the in-place resource were made for buffer zones and high-wall reduction zones. A recovery factor of 90 percent was then applied to the minable resource to determine the recoverable resource.

The rating for transportation was determined from the following table:

Rating	Distance to Established Transportation Link
Good	0-7 miles
Moderate	7-15 miles
Poor	15- miles

For a tract with more than one minable seam a weighted average proximate analysis was figured for the tract. The tract's proximate analysis was then compared to analyses from other marketed coals in the area for rating purposes.

REFERENCES CITED
- Mud Springs Tract -

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